

DP-310881

WHAT IS CLAIMED IS:

1. An antenna unit, comprising:
a wire antenna element;
a patch antenna element, wherein nulls of a terrestrial signal polarization pattern are directed toward a passenger compartment of a vehicle to create a larger spatial region for reception of terrestrial signals that propagate toward the vehicle.
2. The antenna unit according to Claim 1, wherein the patch antenna element includes a high dielectric substrate intermediately located between a top metallization and a bottom metallization.
3. The antenna unit according to Claim 2, wherein a feed pin electrically couples the top metallization to the bottom metallization.
4. The antenna unit according to Claim 1, wherein a height and off-centering of the wire antenna element from a central area of the antenna unit directively shifts the null of the terrestrial signal polarization pattern.
5. The antenna unit according to Claim 1, wherein the wire antenna element is a straight-wire element soldered to the patch antenna element.
6. The antenna unit according to Claim 1, wherein the wire antenna element is a helical element soldered to the patch antenna element.
7. The antenna unit according to Claim 1, wherein the wire antenna element includes a cross-antenna element coupled to a stem that is soldered to the patch antenna element.

DP-310881

8. The antenna unit according to Claim 3, wherein the wire antenna element includes a top plate coupled to a first stem soldered to the patch antenna and a second stem joined directly to the feed pin.
9. A method for improving antenna radiation characteristics, comprising the steps of:
 - providing at least two antenna units in a vehicular diversity application, wherein the antenna unit includes a wire antenna element and a patch antenna element;
 - positioning the antenna unit such that nulls of a terrestrial signal polarization pattern are directed toward a passenger compartment of a vehicle; and
 - providing a larger spatial region for reception of terrestrial signals that propagate toward the vehicle.
10. The method according to Claim 9, wherein the at least two antenna units are positioned in a diversity application.
11. The method according to Claim 10, wherein the diversity application positions are selected from the group consisting of a vehicular a center location, left, driver-side location, a right, passenger-side location, a hood location, a left, driver-side front quarter panel location, a right, passenger-side front quarter panel location, an instrument panel location, an left, driver-side mirror location, and a right, passenger-side mirror location.